

# Ally - A Crowdsourced Distress Signal App

Adithya Anand, Nishanth S, Vamsi Krishna P, Krishna SR and Anjali T

**Abstract**—It is a common belief that with the advent of technology the livelihood of people in a developing community tends to get better over time. It may be true in many cases but in cases of domestic and sexual violence against women there have been no significant development. With the benefit of women, elders and basically any person who is in distress in mind and also the need for a socially centralized social network we have put forward an idea which may help curb rising crime rates by solving various issues which have been unattended by existing methodologies. Ally is a distress signal application with newer and innovative approach to solving the age old problem of rapid redressal. Existing models fail to identify the location of a person if there is no network coverage thus failing ultimately which is why we have implemented a feature to constantly track the location of a person and give the updates to guardians on an half-hourly basis. Also existing models rely on the police or the guardians to help the person in distress whereas we have taken it a step forward to crowd source help in the hour of need by sending distress signal to all nearby Ally app users within a kilometer.

**Index Terms**—Crowd sourcing, GPS tracking, Location sharing, SMS and SOS.

## I. INTRODUCTION

INDIA, known for its cultural heritage, is believed to be one of the peace-loving and law-abiding countries. As of 2019, India is the fastest developing nation in the world next only to China. In a developing nation with a huge history of cultural values, crimes against women are a major hindrance towards development and are often an unwelcome aberration. Even though violence against women is an intolerable offence, women in India encounter inconvenience day in and day out. Although the government has tried its level best in ceasing child marriages and little other violence against women rights, domestic violence and sexual assaults are a common display prevailing in the country. Women empowerment and women's

education have been emphasized over and over again. But there are very few means through which women can empower themselves or ward off any untoward incidents. Often women find themselves in a spot of bother and are helpless in those instances. With the lack of immediate convictions or framework to punish the offenders, crimes against women have become casual and are on the rise. According to the National Crime Records Bureau (NCRB) statistics have shown that for every 15 minutes a rape case is reported. Sexual assaults happen to women literally everywhere like workplace, house, public area, cab, bus, secluded regions etc., A lot of time and effort have been put forth by many researchers to make useful software that people can use during times of distress. But many of these existing methodologies fall short in few pivotal points of action. Ally is designed to fill those technological gaps and provide an efficient way to communicate and request help in an effective manner. In fact this app not only focuses on the women community and so it can be used by anyone who might need help in their hour of need.

This paper improves upon and also discards non-effective functionalities of existing methods and discusses the design and implementation of a distress signal app. Section II of this research paper reviews the previous related works in this domain. The methodologies undertaken and the technologies used are mentioned in section III of this paper. The results are mentioned in section IV of this paper. In general, the objective of the app is to provide relief to people who are devoid of communication or help. Finally conclusion is given in section V.

## II. RELATED WORKS

Vaijayanti Pawar et al discuss a module based alert system which uses Infrared rays to detect hidden cameras in public places thus protecting the privacy of users in the SCIWARS report [1]. A similar model for detecting hidden cameras through radio frequency signal detectors using the ARM controller has been explored in report [2]. They have elaborated about the minimization of hardware modules in women safety devices and thus have zeroed in on a single device which acts as an all-in-one security device. The above reports rely on hardware modules integrated with software to act as privacy protection systems. A single click distress notification application called Abhaya works on the unique feature of continuously sending messages to recipients in a five minute interval upon activation [3].

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I Safe Apps is an app that being an SOS notifier it also provides first aid measures and list of emergency numbers based on location along with video and audio calling features [4]. A shake gesture based SOS activation has been discussed in report [5]. This app also plays a sound to alert even if the guardian's mobile is in silent mode. Auto-dialing concept is used in report [6]. Sending and receiving of messages through PubNub Datastream network is discussed upon in report [7]. This facilitates the sending of messages through the PubNub APIs through dynamic GPS tracking. Application activation through volume rockers and GSM architecture has been mentioned in report [8]. Serial EEPROM systems to store area and city codes in automobiles like cars, buses, auto-rickshaws are mentioned in the report [9]. Wearable arm bands for safety and protection of women and girls is achieved by the analysis of physiological signals in conjunction with body position.

The physiological signals that are analyzed are pulse rate sensors, vibration sensors and if there is any fault it additionally use a fault detection sensor. A detailed representation is explained regarding the same in Design and Implementation of a Rescue System for the Safety of Women by using Arduino Controller [10]. Implementation of similar technology in a smart watch environment is explored in report [11]. Amrita University has extensively worked towards empowering women. One of the researches done in this domain is based on women's safety in cabs [12].

The prototype is a hardware model which when the passenger feels that the driver changes the route or behaves rudely the person can click on the panic button which in turn automates a series of events like locking the driver's seatbelt thus immobilizing the driver, locking the driver's door and unlocking all the other passenger doors thus helping the person relieve themselves from distress. One of the other solutions has been developed in Humanitarian Labs (Hut Labs) which uses IOT to help women raise distress signals [13]. Amrita Personal Safety System developed by the Amrita's Centre for Cyber Security Systems is an inconspicuous, wearable and easy-to-operate electronic device that will help girls and women to trigger communication with family and police when in distress. The device will remain invisible to the offender and yet can easily be triggered by its user with multiple options to ensure stealthy and secure communication [14].

### III. PROPOSED METHODOLOGY

More often, when a woman is molested, assaulted or kidnapped statistics show that 98% of these crimes are committed by someone who is familiar to the woman. Thus almost always there is little time to retaliate or probably raise an alarm. But also taking into account that most of the crimes against women happen in secluded and remote areas, the availability of network coverage is not always guaranteed in all scenarios. Thus most of the existing techniques fall short in regard to this factor. Because of this fact, search and rescue operations become a tedious process as the police have to start from ground zero working their way up to identify the location of the victim. Also not to mention that it might even take several minutes to hours to even realize that a person is missing. Thus a lot of time is wasted in non-fruitful activities.

This is where Ally stands out from existing methodologies. Without compromising the privacy of the user, the user can opt to share their exact whereabouts to their primary guardians and may choose to reveal a vague location to their secondary guardians. The location update happens every half an hour. If a primary guardian client does not get location updates about their wards, a cautionary notification is pushed. Also if a person goes missing, the last known whereabouts of the person is shown in the app thus eliminating the need for police to search and interrogate from ground zero. Thus valuable time is saved. Also the application can be activated through fingerprint gestures and voice-based commands to send SOS messages. Also when a person sends an SOS message, based on the criticality of the distress, users may choose to notify either their guardians, nearby police station or nearby app users. The most innovative feature of the Ally app is crowdsourcing help from nearby app users, which is really a deal breaker as people who are near the victims have a better and faster chance to averting the crime from taking place. The nearby public has a better probability of helping the victim than the guardian or the police. Thus the app infuses a sense of social responsibility upon each and every individual as shown in Fig. 1.

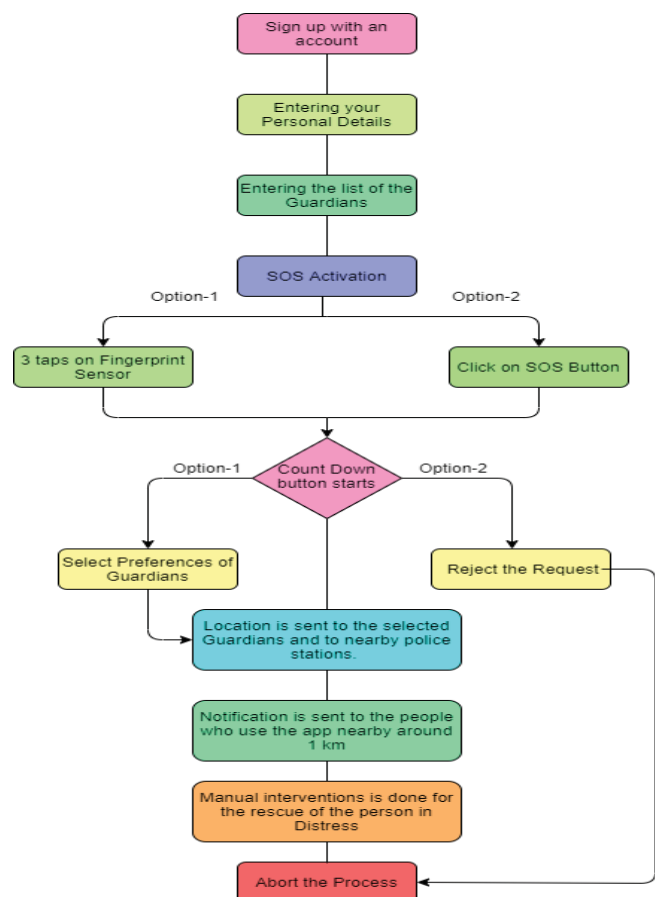


Fig. 1. Flowchart illustrating the working of the app.

A person can quickly activate the SOS function without even going into app, either through the fingerprint gesture or through voice command. Now the SOS doesn't immediately start sending the panic messages since there is always room

for error in the activation. Thus a 30 sec time barrier is provided within which the user can opt to cancel the SOS if it had got activated out of accident. But once the countdown gets over, the panic notifications get sent to the selected guardians, local police stations, ambulance and all nearby Ally app users located within a reachable distance. Once the receivers get the notification and click on it they are provided with the details of the person in distress along with their latitude and longitudinal positions. Now it is upon each receiver's discretion to act upon the situation.

The application is implemented with the Flutter framework which is used for rapid application development. The user data are stored in Firebase Cloud database, which also facilitates the app's faster real-time user location sharing and push notifications. The customized and precise messages generated by the app is done by using Twilio's programmable short message API's. Current distress signal apps have platform dependencies and are based on outdated technology stacks which also result in non-reliable, inconsistent deliverance causing latency in propagation. Our major technical challenge was to reduce the latency and also at the same time propagating the messages in poor bandwidth connections.

Although we try to provide maximum user coverage the major fallback as is the case with other methodologies is the inability to transmit signals in network-less areas. But to minimize this fallback we have used Mapbox API to track the last detected location and direction of last travel, which would give a fair idea, if not the precise location, of where the lost person might be. Also we have included a feature in the app to let users know where their friends and guardians are. The feature shows their current location along with the last updated time and the current status of their friend's battery power.

#### IV. RESULTS

In Fig. 2. the main SOS button page is displayed. If a person is in distress they can press the 'Ask Help' button or can activate the button through fast tap fingerprint gesture. Once activated for a time frame of 30 seconds the user can cancel the alert in case of activation by mistake. After 30 seconds alert messages are sent to guardians, police and nearby app users.

In Fig. 3. the quick help guide have been included to help out people on various scenarios. The survival guide include first aid manual, ambulance service, popular survival tactics for different aspects and police control center numbers. This page also has the functionality to help capture video, photo or audio to transmit the distress situation around a person.

In Fig. 4. we have displayed the Locate Friends page, which displays the current location and phone battery level of friends and guardians. This feature allows us to find the live location or the last updated location of people we monitor.

In Fig. 5, the notification which goes out to nearby users, police and guardians is displayed. On clicking the notification the users are transferred to the page displayed in Fig. 6.

In Fig. 6. the distress notification page mentioned above is displayed. This is the screen that users get on their app if a person within 1 kilometer is in distress. This page gives personal details of the person in distress, their exact latitude

and longitude location and a map to navigate to the person. The page also allows the users to try communicating with the person in distress and also alerting the police about the situation.



Fig. 2. SOS Panic button page

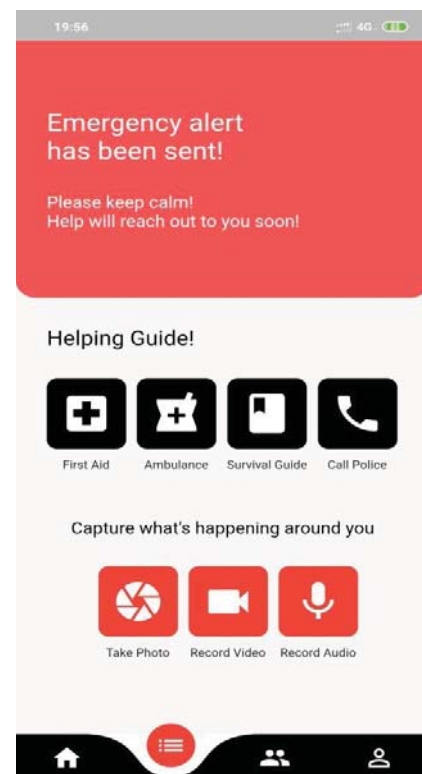


Fig. 3. Quick help guide page

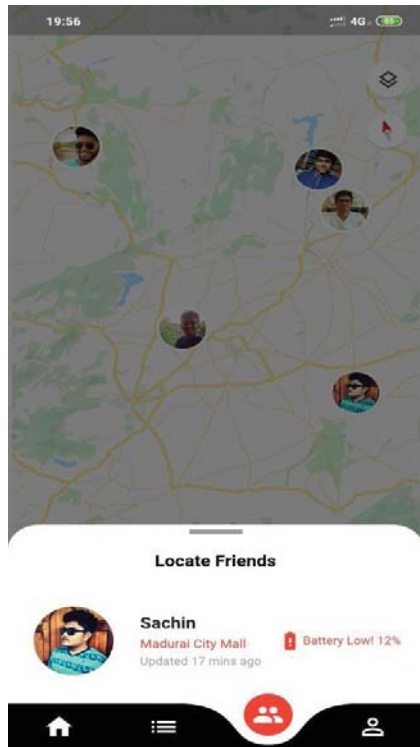


Fig. 4. Locate Friends page

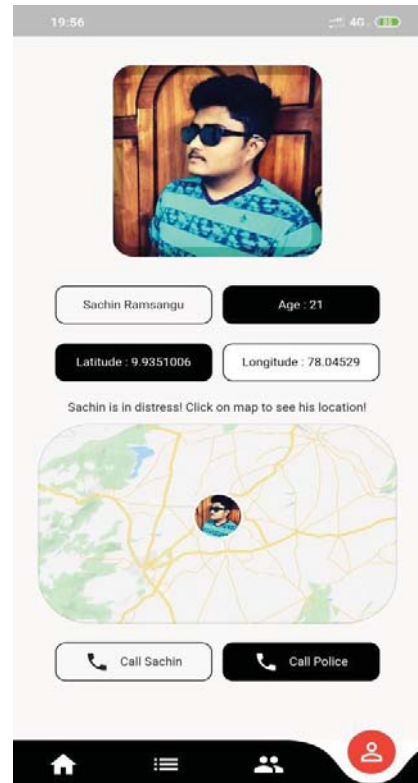


Fig. 6. Distress Notification page

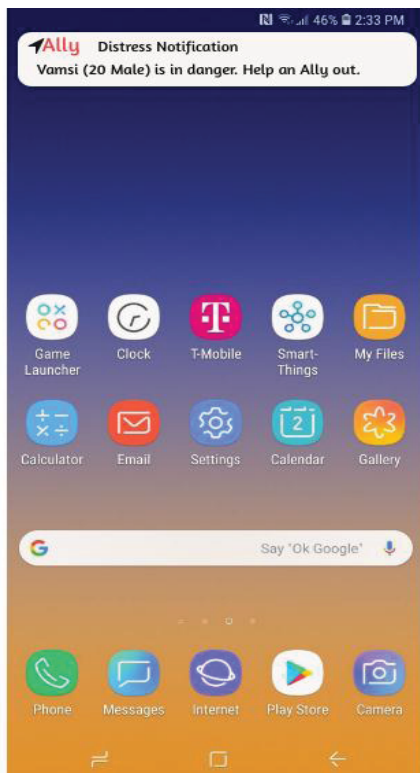


Fig. 5. Notification for users nearby.

## V. CONCLUSION

In this paper we have proposed a novel and innovative way to solve the age old problem of women's safety in India, and thereby created a model that would not only be focused on women's safety but also can be used for personal safety for every member of the society. A networking approach was followed and we created a distress signal notifier with crowdsourcing as a pivotal point of design. We have tried to address the issues with existing methodologies and have redressed the same. Ours is an elegant and efficient design. Thus we conclude that this approach we have taken is the way forward for ensuring personal safety and distress signaling.

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